MATERIAL SAFETY DATA SHEET

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SRM Number: 3063
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SRM Name: 2,3,7,8-Tetrachlorodibenzo-*p*-dioxin (2,3,7,8-TCDD) in Methanol

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SECTION I. MATERIAL IDENTIFICATION

Material Name: 2,3,7,8-Tetrachlorodibenzo-*p*-dioxin (2,3,7,8-TCDD) in Methanol

Description: SRM 3063 consists of five 2-milliliter ampoules containing approximately 1.2 mL of a solution of 2,3,7,8-Tetrachlorodibenzo-*p*-dioxin (2,3,7,8-TCDD) in methanol.

Other Designations:
2,3,7,8-Tetrachlorodibenzo-*p*-dioxin; (debenzo-*p*-dioxin, 2,3,7,8-tetrachloro-; 2,3,7,8-tetrachlorodibenzo (b,e)(1,4) dioxin; 2,3,7,8-TCDD; TCDBD; 2,3,7,8-tetrachlorodibenzodioxin; 2,3,7,8-tetrachlorodibenzo (1,4) dioxin) in **Methanol** (methyl alcohol; wood alcohol; methyl hydroxide; carbinol; monohydroxymethane; wood spirit; wood naphtha; methylol)

Name	Chemical Formula	CAS Registry Number
Methanol	CH_3OH	67-56-1
2,3,7,8-Tetrachlorodibenzo-*p*-dioxin	$C_{12}H_4Cl_4O_2$	1746-01-6

DOT Classification: Methanol; UN1230; Packing Group II; Hazard Class 3.

SECTION II. HAZARDOUS INGREDIENTS

Hazardous Components	Nominal Concentration (%)	Exposure Limits and Toxicity Data
Methanol	100	OSHA TWA: 260 mg/m^3 (200 ppm)
		NIOSH recommended TWA (skin): 260 mg/m^3 (200 ppm), 10 h
		NIOSH recommended STEL (skin): 325 mg/m^3 (250 ppm)
		OES, UK TWA (skin): 266 mg/m^3 (200 ppm)
		OES, UK STEL (skin): 333 mg/m^3 (250 ppm)
		Human, Inhalation TC_{LO}: 86 000 mg/m^3
		Human, Oral LD_{LO}: 143 mg/kg
		Man, Oral TD_{LO}: 3 429 mg/kg
2,3,7,8-Tetrachlorodibenzo-*p*-dioxin	0.00004	No occupational exposure limits established
		Human, Skin TD_{LO}: 107 µg/kg
		Rat, Oral TD_{LO}: 0.2 µg/kg
		Rat, Oral LD_{50}: 20 µg/kg

SECTION III. PHYSICAL/CHEMICAL CHARACTERISTICS

Methanol	2,3,7,8-Tetrachlorodibenzo-*p*-dioxin
Appearance and Odor: a clear, colorless liquid with a characteristic alcohol odor	**Appearance and Odor:** colorless to white crystals; odor not available
Relative Molecular Mass: 32.04	**Relative Molecular Mass:** 321.96
Density: 0.7914 g/cm^3	**Density (water = 1):** not available
Boiling Point: 65 °C (149 °F)	**Boiling Point:** not applicable
Freezing Point: –94 °C (–137 °F)	**Freezing Point:** not available
Vapor Pressure (@ 20 °C): 97.25 mm Hg	**Vapor Pressure (@ 25 °C):** 0.0000002 mm Hg
Evaporation Rate (butyl acetate = 1): 4.6	**Evaporation Rate:** not applicable
Viscosity (@ 20 °C): 0.59 cP	**Viscosity (@ 20 °C):** not available
Water Solubility: soluble	**Water Solubility (@ 25 °C):** very slightly soluble
Solvent Solubility: soluble in ether, benzene, alcohol, acetone, chloroform, ethanol, ketones, and most organic solvents	**Solvent Solubility:** not available

NOTE: The physical and chemical data provided are for the pure components. Physical and chemical data for this methanol/2,3,7,8-Tetrachlorodibenzo-*p*-dioxin solution do not exist. The actual behavior of the solution may differ from the individual components.

SECTION IV. FIRE AND EXPLOSION HAZARD DATA

Methanol
Flash Point: 11 °C **Method Used:** Closed Cup **Autoignition Temperature:** 385 °C

Flammability Limits in Air (Volume %): **UPPER:** 36
LOWER: 6.0

Unusual Fire and Explosion Hazards: Methanol is a severe fire and explosion hazard when exposed to heat or flame. Vapors are heavier than air and may travel a considerable distance to a source of ignition and flash back. Vapor and air mixtures are explosive.

Extinguishing Media: Use alcohol-resistant foam, dry chemical, carbon dioxide, or water spray.

Special Fire Procedures: Fire fighters should wear a self-contained breathing apparatus (SCBA) with a full face piece in the pressure demand or positive mode and other protective clothing.

SECTION V. REACTIVITY DATA

Stability: **X** **Stable** ____ **Unstable**

Stable at normal temperatures and pressure.

Conditions to Avoid: Avoid contact with heat, sparks, flames, or other sources of ignition. Avoid inhalation of vapors or combustion by-products. Keep out of water supplies and sewers.

Incompatibility (Materials to Avoid): Methanol material is incompatible with halo carbons, combustible materials, metals, oxidizing materials, halogens, metal carbide, amines, bases, and acids.

See Section IV**: "**Unusual Fire and Explosion Hazards".

Hazardous Decomposition or By-products: Thermal decomposition products of methanol may include oxides of carbon and various organic fragments. Thermal decomposition products of 2,3,7,8-Tetrachlorodibenzo-*p*-dioxin may include phosgene, halogenated compounds, and oxides of carbon.

Hazardous Polymerization: ____ **Will Occur** **X** **Will Not Occur**

SECTION VI. HEALTH HAZARD DATA

Route of Entry: **X** **Inhalation** **X** **Skin** **X** **Ingestion**

Methanol: Methanol is a skin and eye irritant and can cause nerve damage. This material is harmful if inhaled or absorbed through skin. Ingestion may be fatal or cause blindness. Symptoms of exposure may include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea, and vomiting. Exposure can cause damage to the eyes, liver, heart, and kidneys. Methanol may also cause gastrointestinal disturbances and convulsions.

2,3,7,8-Tetrachlorodibenzo-*p*-dioxin: Inhalation of dusts may cause respiratory tract irritation, headache, dizziness, and nausea. Chloracne may appear a few weeks to several months after exposure and is characterized by inclusion cysts, comedones and pustules, with eventual scaring of the skin. Chronic exposure can produce systemic effects such as fatigue, headache, insomnia, loss of appetite, sensorial impairments, and intolerance to cold. Neuromuscular symptoms may occur. Some individuals have experienced effects on the central nervous system (CNS) and liver. Eye contact may cause irritation. Prolonged or repeated exposure may cause conjunctivitis. Contact with the skin may cause chloracne. Small doses tend to penetrate the skin more readily than larger doses. Thus, chronic low-dose exposure may have a more significant systemic effect.
A lethal dose by ingestion in rats was 20 μg/kg. Effects of poisoning in rats were ruffled hair coat, hunched posture, inactivity and jaundice. Anorexia, dehydration, depression, emaciation, intestinal hemorrhage and alopecia were observed in other animal studies. Animals given acute doses suffered severe weight loss with death delayed one to several weeks. An almost complete loss of adipose tissue was observed at necropsy. Chronic exposures resulted in blood abnormalities and an increased incidence of liver cancers and cancers of the lungs, nose, or mouth in rats maintained on diet containing this material.

Medical Conditions Generally Aggravated by Exposure:

Methanol may affect eye disorders, kidney disorders, skin disorders, and allergies.

2,3,7,8-Tetrachlorodibenzo-*p*-dioxin may affect allergies, eye abnormalities, kidney, liver, respiratory, and skin disorders.

Methanol Listed as a Carcinogen/Potential Carcinogen:

	Yes	No
In the National Toxicology Program (NTP) Report on Carcinogens		X
In the International Agency for Research on Cancer (IARC) Monographs		X
By the Occupational Safety and Health Administration (OSHA)		X

2,3,7,8-Tetrachlorodibenzo-*p*-dioxin Listed as a Carcinogen/Potential Carcinogen[(a)]:

	Yes	No
In the National Toxicology Program (NTP) Report on Carcinogens	X	
In the International Agency for Research on Cancer (IARC) Monographs	X	
By the Occupational Safety and Health Administration (OSHA)		X

[(a)] NTP classifies 2,3,7,8-Tetrachlorodibenzo-*p*-dioxin as a *Known Human Carcinogen*; IARC classifies 2,3,7,8-Tetrachlorodibenzo-*p*-dioxin as *Human Limited Evidence*, *Animal Sufficient Evidence, Group I.*

EMERGENCY AND FIRST AID PROCEDURES:

Skin Contact: Remove contaminated shoes and clothing. Rinse affected area with large amounts of water followed by washing the area with soap and water. Watch for chemical irritations and treat them accordingly. Obtain medical assistance if necessary.

Eye Contact: Immediately flush eyes, including under the eyelids, with copious amounts of water for at least 15 minutes. Obtain medical assistance.

Inhalation: If inhaled, move the victim to fresh air. If breathing is difficult, give oxygen; if the victim is not breathing, give artificial respiration by qualified personnel. Obtain medical assistance.

Ingestion: If ingested, wash out mouth with water. Obtain medical assistance immediately.

TARGET ORGAN(S) OF ATTACK:

Methanol: Central nervous system (CNS).
2,3,7,8-Tetrachlorodibenzo-*p*-dioxin: Immune system (sensitizer).

SECTION VII. PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to be Taken in Case Material Is Released or Spilled: Notify safety personnel of major spills and/or leaks. Evacuate nonessential personnel. Avoid heat, flames, sparks, and other sources of ignition. Stop the leak if one can do so without risk. Absorb small spills with sand or other non-combustible absorbent material and place into containers for proper disposal.

Waste Disposal: Follow all federal, state, and local laws governing disposal. Methanol is subject to disposal regulations U.S. EPA 40 CFR 262, Hazardous Waste Number U154. Keep 2,3,7,8-Tetrachlorodibenzo-*p*-dioxin out of sewers and water supplies.

Handling and Storage: Persons handling this material must wear protective eyewear, clothing, and gloves to prevent contact with this material. Methanol is subject to storage regulations U.S. OSHA 29 CFR 1910.106. Keep separated from incompatible substances.

> **NOTE:** Contact lenses pose a special problem; soft lenses may absorb irritants and all lenses concentrate them. **DO NOT** wear contact lenses in the laboratory.

This material should be stored in the dark at temperatures lower than 30 °C, in a well-ventilated area away from incompatible materials and conditions. Protect containers from physical damage.

SECTION VIII. SOURCE DATA/OTHER COMMENTS

Sources: MDL Information Systems, Inc., MSDS *2,3,7,8-Tetrachlorodibenzo-p-dioxin*, 16 September 2004.
MDL Information Systems, Inc., MSDS *Methyl Alcohol*, 16 September 2004.